

CLAIMS

What is claimed is:

1. An assembly comprising:

a first semiconductor die having at least one lead on the active surface thereof, said at least one lead having at least one conductive pad disposed thereon, said at least one conductive pad having an upper surface, having a thickness and extending above the facing surface of said first semiconductor die the thickness of said at least one conductive pad, said first substrate having a passivation layer disposed on the active surface of said first semiconductor die having a thickness greater than the thickness of said at least one conductive pad, said passivation layer having at least one via therein, said at least one conductive pad extending into and through only a portion of said via, and the first semiconductor die having a layer of adhesive covering at least a portion of said passivation layer on the active surface, said layer of adhesive having a thickness; and

a second substrate die having at least one lead on a facing surface thereof, said at least one lead of said second substrate having at least one conductive pad disposed thereon, said at least one conductive pad of said second substrate having an upper surface, a thickness and extending above the facing surface of said second substrate, the thickness of said at least one conductive pad of said second substrate being at least the combined thickness of the layer of adhesive covering at least a portion of said passivation layer on the active surface of said first semiconductor die and the remaining portion of the via having said at least one conductive pad of said first semiconductor die extending there into of the thickness of the passivation layer on the active surface of said first semiconductor die,

said second substrate being attached to said first semiconductor die by said adhesive layer of said first semiconductor die, said second substrate having the upper surface of said at least one conductive pad on said at least one lead of said first semiconductor die substantially forming moveable, electrical contact without mechanical attachment with the upper surface of said at least one conductive pad on said at least one lead of said second substrate, said moveable electrical contact provided when said second substrate is permanently attached to said first semiconductor die by said layer of adhesive.

2. The semiconductor assembly of claim 1, wherein at least one of said active surface of said first semiconductor die and said second substrate facing surface includes at least one groove thereon.

3. The semiconductor assembly of claim 1, wherein at least one of said first semiconductor die and said second substrate comprises a flip chip.

4. The semiconductor assembly of claim 1, wherein at least one of said first semiconductor die and said second substrate comprises a silicon wafer.

5. An assembly comprising:
a first semiconductor die having at least one lead on the active surface thereof, said at least one lead having at least one conductive pad disposed thereon, said at least one conductive pad having an upper surface, having a thickness and extending above the active surface of said first substrate the thickness of said at least one conductive pad, said first substrate having a passivation layer disposed on the active surface of said first substrate having a thickness greater than the thickness of said at least one conductive pad, said passivation layer having at least one via therein, said at least one conductive pad extending into and through only a portion of said via; and
a second substrate having at least one lead on a facing surface thereof, said at least one lead of said second substrate having at least one conductive pad disposed thereon, said at least one conductive pad of said second substrate having an upper surface, a thickness and extending above the facing surface of said second substrate, the thickness of said at least one conductive pad of said second substrate being at least the thickness of the remaining portion of the via having said at least one conductive pad of said first semiconductor die extending there into of the thickness of the passivation layer on said active surface of said first semiconductor die, said first semiconductor die being attached to said second substrate by an encapsulation material substantially surrounding said first semiconductor die and a portion of said second substrate, said second substrate having the facing surface

of said at least one conductive pad on said at least one lead of said first semiconductor die substantially forming moveable, electrical contact without mechanical attachment with the upper surface of said at least one conductive pad on said at least one lead of said second substrate.

6. An assembly comprising:

a first semiconductor device having at least one lead on a first side thereof, said at least one lead having at least one conductive pad disposed thereon having a substantially flat surface thereon, having a thickness and extending above the first side of said first substrate the thickness of said at least one conductive pad, said first semiconductor device having a passivation layer disposed on said first side having a thickness greater than the thickness of said at least one conductive pad, said passivation layer having at least one via therein, said at least one conductive pad extending into and through only a portion of said via, and said first semiconductor device having a layer of adhesive covering at least a portion of said passivation layer on said first side, said layer of adhesive having a thickness; and
a second substrate having at least one lead on a first side thereof, said at least one lead of said second substrate having at least one conductive pad disposed thereon, said at least one conductive pad of said second substrate having a substantially flat surface thereon, a thickness and extending above the first side of said second substrate, the thickness of said at least one conductive pad of said second substrate being at least the combined thickness of the layer of adhesive covering at least a portion of said passivation layer on said first side of said first semiconductor device and the remaining portion of the via having said at least one conductive pad of said first semiconductor device extending there into of the thickness of the passivation layer on said first side of said first semiconductor device, said second substrate being juxtaposed to said first substrate by said layer of adhesive, said first semiconductor device having said substantially flat surface of said at least one conductive pad on said at least one lead of said first semiconductor device forming moveable, electrical contact without mechanical attachment with said substantially flat surface of said at least one conductive pad on said at least one lead of said second

substrate, said moveable, electrical contact provided when said second substrate is permanently juxtaposed to said first semiconductor device by said layer of adhesive.

7. A semiconductor assembly comprising:

- a first substrate having at least one lead on a facing surface thereof, said at least one lead having at least one conductive pad disposed thereon, said at least one conductive pad having an upper surface, having a thickness and extending above the facing surface of said first substrate the thickness of said at least one conductive pad, said first substrate having a passivation layer disposed on said facing surface of said first substrate having a thickness greater than the thickness of said at least one conductive pad, said passivation layer having at least one via therein, said at least one conductive pad extending into and through only a portion of said via; and
- a second substrate having at least one lead on a facing surface thereof, said at least one lead of said second substrate having at least one conductive pad disposed thereon, said at least one conductive pad of said second substrate having an upper surface, a thickness and extending above the facing surface of said second substrate, the thickness of said at least one conductive pad of said second substrate being at least the thickness of the remaining portion of the via having said at least one conductive pad of said first substrate extending there into of the thickness of the passivation layer on said facing surface of said first substrate, wherein one of said first substrate or said second substrate being attached to another one of said first substrate or said second substrate by a glob top covering said one of said first substrate and adhering to at least a portion of the facing surface of said another one of said second substrate, said second substrate having the upper surface of said at least one conductive pad on said at least one lead of said first substrate substantially forming moveable, electrical contact without mechanical attachment with the upper surface of said at least one conductive pad on said at least one lead of said second substrate, said moveable, electrical contact provided when said second substrate is permanently attached to said first substrate by said glob top.

8. An assembly comprising:

a first semiconductor device having at least one lead on a first side thereof, said at least one lead having at least one conductive pad disposed thereon having a substantially flat surface thereon, having a thickness and extending above the first side of said first substrate the thickness of said at least one conductive pad, said first semiconductor device having a passivation layer disposed on said first side having a thickness greater than the thickness of said at least one conductive pad, said passivation layer having at least one via therein, said at least one conductive pad extending into and through only a portion of said via; and

a second substrate having at least one lead on a first side thereof, said at least one lead of said second substrate having at least one conductive pad disposed thereon, said at least one conductive pad of said second substrate having a substantially flat surface thereon, a thickness and extending above the first side of said first semiconductor device, the thickness of said at least one conductive pad of said second substrate being at least the thickness of remaining portion of the via having said at least one conductive pad of said first substrate extending there into of the thickness of the passivation layer on said first side of said first semiconductor device, said second substrate being juxtaposed to said first semiconductor device having said substantially flat surface of said at least one conductive pad on said at least one lead of said first semiconductor device substantially movably electrically contacting without mechanical attachment said substantially flat surface of said at least one conductive pad on said at least one lead of said second substrate substantially making electrical contact therewith, said first semiconductor device being attached to said second substrate by an encapsulation material substantially surrounding said first semiconductor device and a portion of said second substrate.

9. The semiconductor assembly of claim 6, wherein at least one of said first side of said first semiconductor device and said first side of said second substrate includes at least one groove thereon.

10. The semiconductor assembly of claim 6, wherein at least one of said first semiconductor device and said second substrate comprises a flip chip.

11. The semiconductor assembly of claim 6, wherein at least one of said first semiconductor device and said second substrate comprises a silicon wafer.

12. An assembly, comprising:
a first semiconductor device having a plurality of leads on a first side thereof, each lead of said plurality of leads having a conductive pad disposed thereon disposed in substantially a horizontal plane, each conductive pad having a substantially flat surface disposed in said substantially horizontal plane thereon, having a thickness and extending above the first side of said first semiconductor device the thickness of said conductive pad, said first semiconductor device having a passivation layer disposed on said first side of said first semiconductor device having a thickness greater than the thickness of said conductive pad, said passivation layer having at least one via therein for said each said conductive pad, said each conductive pad extending into and through only a portion of said via, and said first semiconductor device having a layer of adhesive covering at least a portion of said passivation layer on said first side, said layer of adhesive having a thickness; and
a second substrate having a plurality of leads on a first side thereof, each lead of said plurality of leads of said second substrate having a conductive pad disposed thereon in substantially a horizontal plane, each conductive pad of said second substrate having a substantially flat surface disposed in said substantially horizontal plane thereon, a thickness and extending above the first side of said second substrate, the thickness of said conductive pad of said second substrate being at least the combined thickness of the layer of adhesive covering at least a portion of said passivation layer on said first side of said first semiconductor device and a remaining portion of the via having said conductive pad of said first semiconductor device extending there into of the thickness of the passivation layer on said first side of said first semiconductor device, said second substrate being juxtaposed to said first semiconductor device by said layer of adhesive, said first semiconductor

device having at least one conductive pad located on at least one lead of said plurality of leads of said first semiconductor device forming moveable electrical contact without mechanical attachment with at least one conductive pad on at least one lead of said plurality of leads of said second substrate, said moveable, electrical contact provided when said second substrate is permanently attached to said first semiconductor device by said layer of adhesive.

13. The semiconductor assembly of claim 12, wherein at least one of said first side of said first semiconductor device and said first side of said second substrate includes at least one groove thereon.

14. The semiconductor assembly of claim 12, wherein at least one of said first semiconductor device and said second substrate comprises a flip chip.

15. The semiconductor assembly of claim 12, wherein at least one of said first semiconductor device and said second substrate comprises a silicon wafer.

16. An assembly comprising:
a first silicon substrate having a plurality of leads on a first side thereof, each lead of said plurality of leads having a conductive pad disposed thereon in substantially a horizontal plane, each conductive pad having a substantially flat surface disposed in said substantially horizontal plane thereon, having a thickness and extending above the first side of said first silicon substrate the thickness of said conductive pad, said first silicon substrate having a passivation layer disposed on said first side of said first silicon substrate having a thickness greater than the thickness of said conductive pad, said passivation layer having at least one via therein for said each said conductive pad, said each conductive pad extending into and through only a portion of said via, and said first silicon substrate having a layer of adhesive covering at least a portion of said passivation layer on said first side, said layer of adhesive having a thickness; and

at least one semiconductor device having a plurality of leads on a first side thereof, each lead of said plurality of leads of said at least one semiconductor device having a conductive pad disposed thereon in substantially a horizontal plane, each conductive pad of said at least one semiconductor device having a substantially flat surface disposed in said substantially horizontal plane thereon, a thickness and extending above the first side of said at least one semiconductor device, the thickness of said conductive pad of said at least one semiconductor device substrate being at least the combined thickness of the layer of adhesive covering at least a portion of said passivation layer on said first side of said first silicon substrate and a remaining portion of the via having said conductive pad of said first silicon substrate extending there into of the thickness of the passivation layer on said first side of said first silicon substrate, said at least one semiconductor device being juxtaposed to said first silicon substrate by said layer of adhesive, said first silicon substrate having at least one of said conductive pad on at least one lead of said plurality of leads on said first silicon substrate forming moveable electrical contact without mechanical attachment with at least one conductive pad on at least one lead of said plurality of leads of said at least one semiconductor device, said moveable, electrical contact provided when said at least one semiconductor device is permanently attached to said first silicon substrate by said layer of adhesive.

17. The semiconductor assembly of claim 16, wherein at least one of said first side of said first silicon substrate and said first side of said at least one semiconductor device includes at least one groove thereon.

18. The semiconductor assembly of claim 16, wherein at least one of said first silicon substrate and said at least one semiconductor device comprises a flip chip.

19. The semiconductor assembly of claim 16, wherein at least one of said first substrate and at least one semiconductor device comprises a silicon wafer.

20. An assembly comprising:

a first substrate having at least one lead on a facing surface thereof, said at least one lead having at least one conductive pad disposed thereon, said at least one conductive pad having an upper surface, having a thickness and extending above the facing surface of said first substrate the thickness of said at least one conductive pad, said first substrate having a passivation layer disposed on said facing surface of said first substrate having a thickness greater than the thickness of said at least one conductive pad, said passivation layer having at least one via therein, said at least one conductive pad extending into and through only a portion of said via; and

at least one semiconductor device having at least one lead on the active surface thereof having at least one bond pad disposed thereon, said at least one bond pad of said at least one semiconductor device having an upper surface, a thickness and extending above the facing surface of said at least one semiconductor device, said at least one semiconductor device having a layer of adhesive having a thickness on at least a portion of said active surface thereof, said at least one semiconductor device being attached to said first substrate by said layer of adhesive of said at least one semiconductor device, said at least one semiconductor device having the upper surface of said conductive pad on said at least one lead of said first substrate substantially forming moveable, electrical contact without mechanical attachment with the upper surface of said at least one bond pad on said at least one lead of said at least one semiconductor device, said moveable electrical contact provided when said at least one semiconductor device is permanently attached to said first substrate by said layer of adhesive.